Course Title	ROBOTICS			Instructor	Chi-Tai Cheng

Department/Year/Class		Course Details			
Electrical Engineering/ Master TETEM1A	☐Required ■Selective	■0（One Semester） ☐1（1st Semester） ☐2（2nd Semester） ☐3（3rd Semester）		Credits	3

Aim of Education	Core Competences
1. Teach students how to solve electrical problems with electrical engineering/robotic knowledge. 2. Teach students creative thinking and how to be a senior electrical engineer with ability to independently complete the assigned job and have a team work attitude. 3. Teach students global perspective and skills to achieve global competitiveness and face various challenges in the career environment.	A. Have the ability of solving the electrical engineering problem with the professional knowledge. B. Have the ability to manage and execute electrical engineering projects. C. Have the ability of writing professional technical papers. D. Have the creative thinking and ability of solving electrical problems independently. E. Have the ability to cooperate with people who are from the different professional areas. F. Have a global perspective. G. Have the ability to lead, manage and plan. H. Have the lifetime ability to self education.

Course Introduction (50 to 100 words)	This course will teach students the theories and design concepts of the robotics. The course includes lecture, simulation and implementation. The concepts and the theories are taught via the lecture. We will explore the topics such as kinematics, circuit design, motor control, and navigation. In order to reinforce the learning efficiency, implementation of a robotic project is required.

The Relevance among Teaching Objectives, Objective Levels and Core Competences

I.Objective Levels (select applicable ones)：

    (I) Cognitive Domain：C1 Remembering、C2 Understanding、C3 Applying、C4 Analyzing、C5 Evaluating、C6 Creating

    (II) Psychomotor Domain：P1 Imitation、P2 Mechanism、P3 Independent Operation、P4 Linked Operation、P5 Automation、P6 Origination

    (III) Affective Domain：A1 Receiving、A2 Responding、A3 Valuing、A4 Organizing、A5 Charaterizing、A6 Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Core Competences：

    (I)Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objectives. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.

    (II)If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3, C5, and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)

    (III)Determine the core competences that correspond to each teaching objective. Each objective may correspond to one or more core competences at a time. (For example, if one objective corresponds to three core competences: A, AD, and BEF, list all of the three in the box.)

Teaching objectives	Relevance	
	Objective Levels	Core Competences
1 Teach the theory and design skill of robotics	C4	ADH
2 Analyze the robot system	C4	ADH
3 Design a robot system	P6	ADEGH
4 Discuss how to implement the robot system	A6	ABCDEGH
5		
6		
7		
8		

Teaching Objectives, Teaching Methods and Assessment

Teaching Objectives	Teaching Methods	Assessment
1 Teach the theory and design skill of robotics	Lecture	Quiz and homework
2 Analyze the robot system	Lecture	Quiz and homework
3 Design a robot system	Discussion	Quiz and presentation
4 Discuss how to implement the robot system	Simulation and actual implementation	Project
5		
6		

7		
8		

This course has been designed to cultivate the following essential qualities in TKU students.

Essential Qualities of TKU Students	Description
■global perspectives	
■a vision for the future	
■information literacy	
■ethical and moral principles	
■independent thinking	
□an awareness of healthy living	
□effective teamwork	
□an appreciation of the arts	

Course Schedule

Week	Date	Subject/Topics	Note
1	2/22	Introduction to Robotics	
2	3/1	Robotic Systems	
3	3/8	Sensing Techniques	
4	3/15	Robot Vision	
5	3/22	Communication Systems	
6	3/29	Motor Control Method	
7	4/5	Motor Driving System	
8	4/12	Robot Kinematics	
9	4/19	Midterm Presentation	
10	4/26	Midterm Exam Week	
11	5/3	Inverse Kinematics	
12	5/10	Path Planning	
13	5/17	Particle Filter	
14	5/24	Integration of the Robotic System	
15	5/31	Human Machine Interface	
16	6/7	Final Project Reports	
17	6/14	Final Project Reports	
18	6/21	Final Exam Week	

Requirement	
Teaching Facility	■Computer ■Overhead Projector □Other (_____)
Textbook(s)	J.J. Craig, Introduction to Robotics: Mechanics and Control. (3rd ed.) N.Y., Pearson Prentice-Hall, 2005.

Suggested Readings	Saeed B. Niku, Introduction to Robotics, Analysis, Control, Applications. New York: John Wiley & Sons, 2nd edition, 2011.
Number of Assignment(s)	2 (Filled in only for those courses that apply)
Grading Policy	Homework 20% Midterm Presentation 30% Final Project 50%
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at **http://info.ais.tku.edu.tw/csp** or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/index.asp. ※**Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**